REMARKS ON HETEROPTERA IN BEACH DRIFT.

By J. R. de la Torre-Bueno, White Plains, N. Y.

The finding of insects in beach washup on the tide-line is always of interest, not alone because in the Heteroptera this is a most favorable place to find ordinarily rare forms, but also because of the problem of *why* insects fly out to sea. The little collection made at Atlantic City, N. J., on October 11, 1919, illustrates well the first point. One species, *Cyrtomenus mirabilis,* has been but seldom recorded from New Jersey, which appears to be its most northern range and it has not been recorded from between that state and South Carolina. Two others, *Aradus niger* and *Fitchia aptera* are very rare in the winged form.

Cyrtomenus mirabilis Perty. One was found dead and dry high up on the beach, on the high tide line.

Amnestus spinifrons Say. Two were found in the water of the receding wavelets. This has been previously reported from Long Island under the same conditions.

Thyreocoris lateralis Say. This species has not before been recorded from drift; two were found.

Peribalus limbolarius Stål. One specimen.

Podisus modestus Dall. One specimen, badly damaged. This and the preceding have not heretofore been reported from drift.

Nysius ericæ Schill. Although only one badly battered specimen was taken, this has been reported from drift both by Parshley and myself.

Aradus niger Stål.

Fitchia aptera Stål. These two species have not been before reported from drift; both were in the rare winged form, as already noted.

Lygus pratensis Linn. A very lively specimen of this species not before known from drift.

Acanthia sphacelata Uhler. One very lively specimen was found in the water. Parshley has reported it.

Micracanthia humilis Say. Three were found quite waterlogged; Parshley and myself have previously found it on the tide-line.

Ochterus banksi Barber. One very lively specimen gives the first record for this species in the surf.

For the purpose of arriving at some explanation of this phenomenon, the weather conditions were carefully noted. The day

before, Friday, October 10, had been warm, humid and showery in the morning, clearing by afternoon, but the atmospheric condition continued. *Cyrtomenus mirabilis* being found the following morning at about 11 a. m. dead on clean sand away toward the water from any drift might seem to have been in flight on the day before. The 11th dawned bright and warm (70° at 9 a. m.), and warmed up as the day went on. Nothing was found floating in on the wash-up except a very few beetles and the *Lygus pratensis* noted. After noon, at about 3 o'clock, it began to grow a little cloudy, finally getting completely overcast by 8 p. m. and raining heavily. Insects were flying about in the morning, notably *Eristalis* and other hover flies and common Lepidoptera, none of which, however, was found on the tide line. Up to about 4 or so, the wind had blown in steadily and strongly from of the wet weather. The insects were taken on the edge of the advancing tide, which was coming in at about 5 p. m. The the sea, changing at that time to a land breeze with the coming greater part of them was taken between that hour and a little after six. These included both the *Acanthias, Ochterus, Thyreocoris, Geotomus, Aradus, Peribalus, Alydus, Nysius* and *Podisus.* The *Fitchia* was taken at about 4, the only bug on the stretch of beach at the Inlet, near the Absecon lighthouse. The poor condition of the *Podisus, Nysius* and *Alydus* might show that they had been in the water for some time.

What are the conditions that control these flights leading into the sea? We seem to have now in hand certain data on which to base a temporary explanation.

Needham says:[1] "After every on-shore breeze following sunshiny summer weather some insects are cast up by the waves and there is a great accumulation of them." It was under these conditions that he found large numbers of beetles on the shores of Lake Michigan.

In 1914 I noted[2] a heavy sea-breeze, raw and gusty, with warm weather inland. As I remember, it was a typical October day, with bright sun occasionally obscured by clouds. In 1913, I

[1] 1904, "Beetle Drift on Lake Michigan," Can. Ent., XXXVI: 294–296.
[2] 1915, "Hemiptera in Beach Drift," Ent. News, XXVI: 274–279.

noted a windy day with occasional clouds, direction of the wind not observed.

Of Parshley's three experiences[3] two were in midsummer and the other in June. Here again the breeze was on-shore with fair weather. In my collecting and Parshley's one less obvious fact appears: that the bugs were found in the afternoon.

Of course, the imagining of explanations for natural phenomena is a pleasing intellectual effort; and the explanation may or may not be true. In the present case we have eight factors.

1. On-shore wind.
2. Preceding fair, warm weather.
3. Bright sunshine.
4. Abundance of insects in the afternoon.
5. No nuptial flights.
6. Fair representation of insects but no great abundance of any one species.
7. Abundant wild vegetation back of the beach (not mentioned in other paper by myself).
8. Period of arrival at maturity of many species, or at height of number of mature insects.

Parshley's remark[4] that at such times "the ocean reflects the sunlight with a peculiar sparkling brilliancy" seems to me to be the key to the problem.

On the days under discussion the insects are moved to flight by the warmth of the atmosphere in the afternoon or late morning. These flights must be in the upper air, since the insects are not noticeable as to numbers while in flight. The bugs that travel against the wind go out to sea. Here, they either get tired and fall exhausted into the sea; or the intense and dazzling reflection of the sun from the ocean surface attracts them. The insects perceive it, and phototropism lures them to their doom. They fly toward this dazzling light, and are either exhausted by having to struggle against the wind, or naturally gravitate toward the source of light, there to perish.[5] The wind, being on-shore,

[3] 1917, "Insects in Beach Drift, I—Hemiptera Heteroptera," Can. Ent., XLIX: 45–48.

[4] Op. cit., 48.

[5] 1914, "Phototropism in Heteroptera," this BULLETIN, IX: 90–96, J. R. de la Torre Bueno.

propels the insects back to the beach, for, were it off-shore, it would blow the insects not in the range of the breakers out to sea.

Or, to put it another way: On any day of sunshine and warmth, when insects are mature, they fall into bodies of water in their flights, either through exhaustion or lured thereto by the dazzling reflection of the sun. They are found most abundantly when the wind is off-shore, because it blows them in. The controlling factor for their fall into the water may be phototropism or weariness, or both.

This conclusion is substantially the same that Dr. Needham arrived at in his 1917 paper,[6] which has come to my notice after writing the preceding.

This phenomenon, of course, is one phase of that which leads to the finding of insects on shipboard at great distances from land.[7]

NOTES ON BEETLES OF THE GENERA MELASOMA AND GONIOCTENA.

By Wm. T. Davis, New Brighton, Staten Island, N. Y.

On June 13, 1914, Col. Wirt Robinson, Mr. Charles Schaeffer and the writer were on the top of Crow's Nest Mt., West Point, N. Y. On the northerly extension of the mountain we found a number of *Melasoma tremulæ* Fab. on the small poplars and willows growing in a depression in the otherwise generally rocky surface. On one of the willows we found *Melasoma interrupta* Fab. associated with *Melasoma tremulæ*. The writer discovered a male *interrupta* that was apparently in copulation with a female *tremulæ,* but as the insects had been disturbed we were not sure. They were, however, removed with a few of the willow leaves to a bottle, and on the evening of June 18 were found in copulation and examined with a glass to avoid any chance of error.

The *Melasoma interrupta* here mentioned is known as *Lina lapponica* Linn. in many collections, but in our native *interrupta* the

[6] 1917, "The Insect Drift of Lake Shores," Can. Ent., XLIX: 129–137. This has a bibliography of eight titles bearing on the subject.

[7] 1867, G. R. v. Frauenfeld, "Insectenleben zur See," K. K. Zool.-Bot. Ges. Wien, 1867, pp. 1–40 of separate.